ARTICLE 89-14

STREAM CROSSINGS

CHAPTER 89-14-01
STREAM CROSSING DESIGN

89-14-01-01. Standards. Except as provided in section 89-14-01-06, all highways constructed or reconstructed by the department of transportation, board of county commissioners, board of township supervisors, their contractors, subcontractors, or agents, or by any individual firm, corporation, or limited liability company must be designed to meet the standards contained in this chapter. The department, or any board of county commissioners, board of township supervisors, their contractors, subcontractors, or agents, or any individual, firm, corporation, or limited liability company that fails to comply with these standards is not entitled to the immunity provided in section 24-03-06, 24-03-08, or 24-06-26.1 of the North Dakota Century Code.

History: Effective May 1, 2001; amended effective July 27, 2001.
General Authority: NDCC 24-02-01.1, 24-02-01.5, 28-32-02, 61-03-13
Law Implemented: NDCC 24-03-06, 24-03-08, 24-06-26.1

89-14-01-02. Definitions.

1. "Construct" means to construct a new highway on a new location or corridor.

2. "Reconstruct" means to regrade or widen an existing roadbed on the existing highway location. For purposes of this chapter, reconstruct also includes replacing, modifying, or installing a stream crossing.

History: Effective May 1, 2001.
General Authority: NDCC 24-02-01.1, 24-02-01.5, 28-32-02, 61-03-13
Law Implemented: NDCC 24-03-06, 24-03-08, 24-06-26.1

89-14-01-03. Design flood frequency. The following table provides the recurrence interval of the event for which each type of crossing must be designed.

This represents a minimum design standard. Nothing contained in this chapter is intended to restrict the road authority from providing greater capacity.

Type of Crossing	State Highway System						County	
	Urban System		Rural System				Rural System	
	Regional	Urban	Principal Arterial		Minor	Major	Major	Off[4]
		Roads	Interstate	Other	Arterial	Collector	Collector	System
Bridges & Reinforced Concrete Boxes	25 year[2]	25 year[2]	50 year[2]	50 year[2]	50 year [2]	25 year[2]	25 year[2, 3]	15 year[2, 3]
Roadway Culverts	25 year[2]	25 year[2]	50 year[2]	25 year[2]	25 year[2]	25 year[2]	25 year[2, 3]	15 year[2, 3, 5]
Storm Drains	10 year[1]	5 year[1]	10 year[2]	10 year[2]	10 year[2]	10 year[2]		
Underpass Storm Drains	25 year[1]	25 year[1]	50 year[2]	25 year[2]	25 year[2]	25 year[2]		

[1]Discharges shall be computed using the rational method or other recognized hydrologic methods.

[2]Discharges shall be computed using United States geological survey report 92-4020 or other recognized hydrologic methods.

[3]If an overflow section is provided, the pipes and the overflow section, in combination, must pass the appropriate design event within the headwater limitations provided in this chapter.

[4]Off system roads include all township roads.

[5]For township roads, the recurrence interval is 10 years.

History: Effective May 1, 2001; amended effective July 27, 2001.
General Authority: NDCC 24-02-01.1, 24-02-01.5, 28-32-02, 61-03-13
Law Implemented: NDCC 24-03-06, 24-03-08, 24-06-26.1

89-14-01-04. Floodplain consideration - Upstream development. All stream crossings must comply with applicable floodplain regulations and regulatory floodway requirements. If a stream crossing is being replaced and buildings or structures are located upstream from the crossing, the stream crossing must not be constructed or reconstructed in a manner that increases the likelihood of impacts to those upstream buildings or structures from that which existed with the stream crossing being replaced, even if the capacity of the crossing being replaced was greater than the capacity otherwise required by this chapter. Any stream crossing constructed as part of a newly constructed roadway shall be constructed to pass a one hundred-year event without the resulting increase in headwater impacting any existing buildings or structures. Structures, for the purposes of this section, include grain bins, silos, feedlots, and corrals. Structures do not include pasture fencing.

History: Effective May 1, 2001.
General Authority: NDCC 24-02-01.1, 24-02-01.5, 28-32-02, 61-03-13
Law Implemented: NDCC 24-03-06, 24-03-08, 24-06-26.1

89-14-01-05. Allowable headwater. The allowable maximum headwater when passing the design discharge must be measured from the bottom of the channel. For arch pipes, the maximum allowable headwater must be based on the rise of the pipe, and the pipe size category must be the equivalent round pipe size. For multiple pipe installations, the pipe diameter used to calculate the allowable headwater must be the diameter of the largest pipe. Tailwater resulting from downstream conditions, either natural or manmade, must be accounted for in the determination of the crossing's capacity and the resulting headwater. Additional guidance is provided in the North Dakota department of transportation design manual.

Streambed Slope (feet/mile)	Pipe Size	Allowable Headwater
<5	24" - 54"	pipe diameter + 2 feet
	≥ 60"	1.5 pipe diameters
5 to 10	24" - 36"	pipe diameter + 2 feet
	42" - 54"	1.5 pipe diameters
	≥ 60"	2 pipe diameters
> 10	≥ 24"	2 pipe diameters

History: Effective May 1, 2001.
General Authority: NDCC 24-02-01.1, 24-02-01.5, 28-32-02, 61-03-13
Law Implemented: NDCC 24-03-06, 24-03-08, 24-06-26.1

89-14-01-06. Deviations. The board of county commissioners, board of township supervisors, their contractors, subcontractors, or agents, or any individual, firm, corporation, or limited liability company may deviate from the standards contained in this chapter if the deviation is approved in writing by the state engineer and the director of the department of transportation. A request to deviate from the standards must be made in writing and must set forth the reasons for the deviation. The state engineer and department of transportation may grant a deviation for good and sufficient cause after considering public safety, upstream and downstream impacts, and other relevant matters. The department of transportation may deviate from these standards if the director of the department determines it is appropriate to do so and the crossings are designed in accordance with scientific highway construction and engineering standards. The basis for the director's decision must be documented in writing. If a crossing results in less than one-half foot [15.24 centimeters] of headloss when passing the appropriate design discharge, the headwater limitations of section 89-14-01-05 do not apply.

Roads constructed as part of a surface coal mining operation for use solely as part of the mining operation are not subject to the requirements of this chapter. Roads constructed as a result of a surface coal mining operation for use by the public

are bound by the requirements of this chapter, but deviations may be requested in accordance with this section.

History: Effective May 1, 2001.
General Authority: NDCC 24-02-01.1, 24-02-01.5, 28-32-02, 61-03-13
Law Implemented: NDCC 24-03-06, 24-03-08, 24-06-26.1